Using Wildlife Vehicle Collision Data, Expert Opinions and GPS Technology to More Accurately Predict and Mitigate Vehicular Collisions with Wildlife in Northern British Columbia

Roy V. Rea¹, Eric K. Rapaport¹, Dexter P. Hodder², Michael V. Hurley¹ and Nicole A. Klassen¹

¹University of Northern British Columbia, 3333 University Way, Prince George, BC. V2N 4Z9

²John Prince Research Forest, University of Northern British Columbia, P.O. Box 2378, Fort St James, BC. V0J 1P0

Thousands of vehicular collisions with wildlife occur on British Columbia (BC) roads each year (Sielecki 2004). Despite attempts at mitigating the losses, collisions with particular species continue to rise (pers comm. David Dickson, Insurance Corporation of British Columbia (ICBC) - Regional Loss Prevention Manager, North Central Interior) (Figure 1). Lack of effective countermeasure implementation and failure to reduce claims appears to be due, in large part, to a lack of accurate record keeping and data accessibility. What species of animals are being struck by motorists and when and where it is that these collisions are occurring across the province is unclear.

In an effort to more accurately pinpoint when and where collisions with various species of wildlife are occurring on northern BC roads, we are analyzing 10 years of ICBC automobile claims data, Wildlife Accident Reporting System (WARS; provided by Ministry of Transportation) data and information that we have collected from local experts (road maintenance contractors, highway patrol, conservation officer service, etc) on where collisions are perceived to be recurrent. In addition to these methods, we have partnered with three local trucking companies (Excel Transportation Inc., Lomak Bulk Carriers Corp. and Grandview Transport Ltd.) based in Prince George, BC to record data on roadside animal occurrences in an innovative way.

With the help of a company based in Winnipeg, we have modified a road safety device that utilizes Global Positioning System (GPS) technology to capture date, time, and location using specifically designed waypoint buttons for deer (*Odocoileus* spp.) and Moose (*Alces alces*), which are the most commonly observed large animals on roads in northern BC. Ten units are currently deployed in trucks that ferry goods back and forth along designated routes in northern BC several times a day. When a truck driver observes a Moose or deer in the road corridor, he or she depresses the appropriate button to record a waypoint of that animal. If the deer or Moose observed is dead, the trucker depresses a “dead” button on the unit quickly after selecting the Moose or deer button. Location, date, and time of day as well as species and whether or not the animal is dead are recorded in the unit’s memory. Twice per month, data are downloaded by company dispatchers and e-mailed to our research team at the University of Northern BC where it is uploaded into GIS mapping

Figure 1. Collisions with Moose continue to be a serious threat to the motoring public in many parts of northern BC. Highway 16 east of Vanderhoof, BC. June 2003 (Roy Rea).
software and mapped (Figure 2).

GPS technology is widely used for wildlife and habitat monitoring (Hulbert and French 2001) and is used by wildlife managers and hunters as a tool to spatially monitor hunting behaviour and success (Stedman et al. 2004). GPS is also recently beginning to be used for recording wildlife vehicle collision locations (Huijser et al. 2005). Although professional drivers have been employed to collect long-term wildlife sightings in places such as national parks (Burson et al. 2000), having drivers do so with the type of technology we are experimenting with remains unpublicized.

Although the project is still in its infancy (our GPS

Figure 2. Map showing GPS-recorded locations for Moose and deer (over a one week period in July 2006) and sections of Highway 16 determined by experts to be “hotspots” for collisions with wildlife. Note: Final versions of the maps will also include input from WARS database.
units were deployed in July), our results are exciting and promise to help us build a robust database, where information can be recorded on when and where various species are observed along roadsides and/or are being struck by vehicles. Additionally, the GPS device has the potential to be further modified and used to record roadside occurrences of several different species. Furthermore, the system has the potential for uploading data via wireless networks or satellite linkages for peer to peer real-time usage.

For now, our combined data sets will soon be used to help us more precisely predict when and where animals are most likely to occur along highways. Site investigations of these roadside areas will be conducted and the information analysed to help us determine why animals are found associated with particular areas. A better understanding of the roadside ecology of wildlife species will then allow us to recommend countermeasures that are site- and species-specific and do so in a way that, in northern BC, has yet to be done.

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Literature Cited


About the Authors
Roy (Figure 3) teaches Animal Physiology, Field Applications in Resource Management and Plant Systems labs at UNBC and has been studying the ecology of ungulate collisions for the past six years. Eric is a professor in the School of Environmental Planning at UNBC researching interactions between infrastructure planning and environment, and teaches environmental impact assessment, integrated resource management, and ecological design.

Dexter (Figure 3) is the Research Coordinator for the John Prince Research Forest based in Fort St. James, BC. He works on a variety of wildlife and habitat monitoring projects including species such as Moose, deer, bears and River Otters.
Michael is a Master of Science candidate in the Natural Resource and Environmental Studies program at UNBC analyzing the spatial patterns and processes of Moose vehicle collisions in Mount Revelstoke and Glacier National Parks.

Nicole is a fourth-year biology & chemistry joint major undergraduate student at UNBC, and is a research assistant working on strategies to reduce vehicle collisions with wildlife in northern BC. She has a passion for animals and thoroughly enjoys working with and for them.

ROADWATCH BC: A PROGRAM FOR COLLECTING, CENTRALIZING, AND SYNTHESIZING INFORMATION FROM VEHICLE-INDUCED WILDLIFE MORTALITIES IN BRITISH COLUMBIA

R. Wayne Campbell¹ and Michael I. Preston²

¹ 2511 Kilgary Place, Victoria, BC. V8N 1J6
² 106 – 991 Cloverdale Ave., Victoria, BC. V8X 2T5

Road mortality of wildlife has attracted growing public attention throughout the world since Stoner (1925) published his classic paper *The Toll of the Automobile* in the journal *Science*. Today, an expanding network of roads and highways to transport people and goods, increased speed limits, habitat fragmentation, urbanization, and a rapidly growing human population poses a major threat to wild animals (Sherwood et al. 2002).

Regularly documenting collisions between motorized vehicles and wild animals in British Columbia was started in 1964 by the senior author and formally introduced in 1973 as part of a provincial “Wildlife and Roads” program that also included roadside surveys of raptors (Campbell et al. 1988). The initial autumn survey, covering about 2,250 km across southern British Columbia from 10 to 15 September 1973, tallied 87 road fatalities for 26 species of amphibians, reptiles, birds, and mammals (Campbell 1973). Eleven years later a summer survey, in July, for the same general route produced 146 dead animals representing 42 species of higher vertebrates (Campbell 1984). Individual records add up quickly over the years and during the 43 years that Campbell maintained field notebooks, close to 12,000 incidental records of road-killed wildlife have been documented.

By the mid-1970s, a few other individuals became interested in recording roadside carcasses and their records were added to a centralized dataset. Each record became a permanent data point that, when incorporated into a centralized database, adds information on the distribution, occurrence, ecology, and natural history of vertebrates (and invertebrates) in the province. In addition, the summarized records have contributed to our knowledge of the seasonal and annual impact of vehicle collisions to wildlife and aided in developing mitigation plans to protect species when they are most vulnerable.

While reporting every roadkill with full details is useful, we have highlighted a few of the more noteworthy records in the following four broad categories: 1) Distribution, 2) Occurrence, 3) Natural History, and 4) Conservation. Table 1 provides examples of road-killed animals in each of these categories.

**Distribution**

Roadkills have provided significant records of range expansions and filled in gaps in the known distribution of wildlife in the province (Table 1). In many cases, records of highway mortalities of wildlife provide very useful information that otherwise would be difficult to collect. Some of these include occurrences of nocturnal migrants such as the Northern Saw-whet Owl (*Aegolius acadicus*), nocturnal mammals including the North American Opossum (*Didelphis virginiana*) and Northern Flying Squirrel (*Glaucomys sabrinus*), rare wildlife such as the Spotted Owl (*Strix occidentalis*) and American Badger (*Taxidea taxus*), seasonal movements of the Western Toad (*Bufo boreas*) and Painted Turtle (*Chrysemys picta*), and documenting range expansions for introduced species like the Eastern Cottontail (*Sylvilagus floridanus*) and Eastern Gray Squirrel (*Sciurus carolinensis*) especially on Vancouver Island.

Within urban and residential environments the...